

[REDACTED]

#504

VOYAGER 1  
RADIO OCCULTATION BY SATURN'S RINGS  
77-084A-02C

[REDACTED]

VOYAGER 1

RADIO OCCULTATION-SATURN'S RINGS

77-084A-02C

This data set has been restored. Originally there was one 9-track, 800 BPI tape, written in Binary. There is one restored tape. The original tape was created on an IBM 250A computer and was restored on an IBM 9021 computer. The DR tape is a 3480 cartridge and the DS tape is 9-track, 6250 BPI. The DR and DS number along with their corresponding D number and time span is as follows:

DR#	DS#	DD#	FILES	TIME SPAN
DR-005504	DS-005504	DD-056367	3	11/13/80

<u>REQ. AGENT</u>	<u>REQ. NO.</u>	<u>ACQ. AGENT</u>
DEW	V0179	WSC

VOYAGER 1  
RADIO OCCULTATION BY SATURN'S RINGS  
77-084A-02C

This data set catalog consists of 1 tape. The tape is 800 bpi, 9 track, with 3 files of data. The tape was created on a Data Eclipse S-250A computer. The D and C numbers are as follows:

<u>D#</u>	<u>C#</u>	<u>Time Span</u>
D-56367	C-23022	11/13/80



## CENTER FOR RADAR ASTRONOMY

STANFORD UNIVERSITY  
DEPARTMENT OF ELECTRICAL ENGINEERING  
STANFORD, CALIFORNIA 94305

January 14, 1983

77-084A-02 ✓

RADIO OCCULTATION BY SATURN'S RINGS

National Space Science Data Center  
NASA/Goddard Space Flight Center  
Code 601  
Greenbelt, Maryland 20771

Attn: Ralph Post

Under separate cover we are submitting to the NSSDC a tape containing results from the Voyager 1 Radio Occultation experiment at Saturn. The tape is identified as "Voyager 1 Radio Occultation by Saturn's Rings," 800 BPI, 14 January 1983, 9 track. This tape constitutes a partial submission of radio science results from Saturn. Enclosed please find a copy of "Voyager 1 Radio Occultation by Saturn's Rings Archival Data Set," prepared by R.A. Simpson, 14 January, 1983, which describes the aforementioned tape and its contents in useful detail.

Questions regarding the status of Radio Science data for the NSSDC should be addressed to myself ((415) 497-3535), questions regarding the details of this tape or the documentation should be addressed to R.A. Simpson ((415) 497-3525).

Best regards,

*Len Tyler*

Len Tyler

ENC.



## CENTER FOR RADAR ASTRONOMY

STANFORD UNIVERSITY  
DEPARTMENT OF ELECTRICAL ENGINEERING  
STANFORD, CALIFORNIA 94305  
30 March 1983

National Space Science Data Center  
NASA/Goddard Space Flight Center  
Code 601  
Greenbelt, MD 20771

77-084A07c

Attn: Ralph Post

The archival data tape we sent (our letter of 14 January 1983) for the Voyager 1 Radio Occultation Experiment was improperly constructed. Although a valid data set in itself, it is not the data set described in the accompanying documentation.

Enclosed please find a replacement data tape and revised documentation.

Questions regarding the overall status of Radio Science data for Saturn should be addressed to Dr. G. Leonard Tyler, Principal Investigator, at the address above or at 415-497-3535.

Questions regarding this (or the previous) archival data set/tape should be directed to me (415-497-3525).

I apologize for the inconvenience this has caused. If you have records of those who have requested copies of our data set within the past two months, I would be glad to contact them to alert them to this error.

Yours truly,

A handwritten signature in black ink, appearing to read "Richard A. Simpson".

Richard A. Simpson  
Senior Research Associate

enc.

cc: A. Collins  
J. Cuzzi

Voyager Radio Science Experiment

Voyager 1  
Radio Occultation by Saturn's Rings  
Archival Data Set

Forwarded to NSSDC  
14 January 1983  
Revised: 22 March 1983

Prepared by: R.A. Simpson  
Center for Radar Astronomy  
Stanford Electronics Laboratories  
Stanford University,  
Stanford, CA 94305

415-497-3525

## VOYAGER 1 RADIO OCCULTATION BY SATURN'S RINGS

Archival Data Set - Sent to NSSDC 24 March 1983

This tape contains reduced data from the Saturn's Rings Voyager 1 Radio Occultation Experiment, which was conducted on 13 November 1980 (Fig. 1). During the experiment the strength of the signals propagating through the rings at radio wavelengths 13 cm and 3.6 cm was measured. These tapes contain the amplitude measurements at each wavelength, supplementary information on experimental conditions and subsequent data reduction, and vectors defining the experimental geometry as reconstructed afterward.

This documentation includes a brief summary of the experiment, an outline of the data reduction, a description of the data record structure, and information on number conventions for the Data General Eclipse S-250A (on which this tape was generated).

The tape itself is 800-bpi, 9-track. Each physical record contains 600 16-bit words. Logical data are in a mixed format including 16-bit integers, 32-bit single precision floating point, 64-bit double precision floating point, and literal (8 bits per character, ASCII code).

### Experiment

During the experiment the spacecraft telecommunications antenna was aimed directly toward earth. Telemetry modulation was suspended so that maximum transmitted power would appear at the carrier frequency. A highly stable on-board oscillator guaranteed maximum stability of this frequency during the Saturn encounter. Coherent transmissions, controlled by this oscillator, were made at 13 and 3.6 cm wavelengths. The transmitted signals had right circular polarization.

Signals were received on earth at the NASA Deep Space Network station near Madrid, Spain, using its 64-m diameter antenna (Fig. 2). Local oscillators at the station were driven from the same standard in each of four receivers so that coherence was maintained. Data were recorded from receivers at each wavelength using both left- and right-circular polarization. Only right-circular data are included here. An overall view of the experiment, including important equipment parameters, is given in Eshleman et al. ("Radio Science Investigations with Voyager," Space Science Reviews, 21, 2, 207-232, November 1977).

For more detailed information on the experiment and the data processing, the reader should consult the paper by G.L. Tyler et al. ("The Microwave Opacity of Saturn's Rings at Wavelengths of 3.6 and 13 cm from Voyager 1 Radio Occultation") in the special Voyager issue of Icarus (1983).

## Data Reduction

Data were received at Stanford in the form of computer compatible tapes of 8-bit amplitude samples. Each of the four polarization/wavelength data sets was processed separately (Fig. 3). The sampling rate at 13 cm was  $10^5$  samples per second, corresponding to a bandwidth of 50 kHz; at 3.6 cm the sampling rate was  $3 \cdot 10^5$  samples/sec for a bandwidth of 150 kHz.

The data were digitally filtered and decimated to reduce the bandwidth and sampling rate. This was accomplished in steps, each being a factor of 8 reduction. Concurrently, the experimental geometry was reconstructed and drift of the signal (resulting from the relative motion of the spacecraft and receiving station, and small relativistic effects) was removed by a process of digital heterodyning.

From power spectra computed using successive time samples, the amplitude of the received signal was determined as a function of time using a fitting algorithm (program MBPOWERFIT2AP). The fitting procedure was constrained to the central frequency bin and the immediately adjacent two bins on either side; total number of points in the spectrum varied from 64 to 256, depending on signal-to-noise ratio. Frequency residuals were obtained during the same analysis and are included in the data on tape.

The Jet Propulsion Laboratory reconstructed the antenna pointing sequence. These data -- in conjunction with pre-flight antenna pattern measurements, the reconstructed observational geometry, and measurements of the system temperature for each receiver during the experiment -- may be used to estimate the expected signal amplitude at the receiver. These data have been included in the archival data set (program RINGDATAMERGE), but no corrections have been made. A simple subroutine (BEAM) to estimate antenna gain as a function of angle from boresite is appended to this documentation.

## Data Description

Data included here is a composite set and closely approximates that published by Tyler *et al.* (1983). File 0 contains one record of identification data; file 1 contains 13 cm data, and file 2 contains 3.6 cm data. All physical records contain 300 integer words.

Integer words are 16-bit; unless otherwise indicated the term "word" will mean integer word in the descriptions which follow. Single precision floating point words are 32-bit and double precision floating point words are 64-bit. Negative numbers are represented as twos-complements of their positive values. Mantissa/exponent conventions are shown in the appended chart. Literal data are represented as 8-bit ASCII characters.

Except as noted:

- 1) vectors are in a heliocentric EME-1950.0 system,
- 2) vectors to and from planets are with respect to centers of mass,
- 3) linear dimensions are in meters,
- 4) angles are in degrees, and
- 4) time is in E.T. seconds from 1950.0 at the point where the event (e.g., emission, reception, intersection) occurs.

The "Saturn system" mentioned in the descriptions which follow uses the pole vector defined by the combined results of the Voyager radio and UVS occultations (Simpson *et al.*, *Bull. AAS*, 14, p.731, 1982). In EME-1950.0 coordinates it is

$$\alpha_{50} = 38.429^{\circ} \quad \delta_{50} = 83.324^{\circ}$$

The x-axis is toward the ascending node of the Saturn mean equator (of date) on the mean 1950.0 earth equator. A second Saturn system, based on the Sturms (F.M. Sturms, Jr., "Polynomial Expressions for Planetary Equators and Orbit Elements with Respect to the Mean 1950.0 Coordinate System," Technical Report 32-1508, Jet Propulsion Laboratory, Pasadena, CA, 1971) pole and equinox, is also used but only to obtain sub-intercept planetographic longitude  $\lambda$  (as per Desch and Kaiser, *Geophys. Res. Lett.*, 8, 253-256, 1981). Please refer to the attached figures for definitions.

The amount of integration required for a measurement is given in the table below; gaps in the table result from non-contiguity of data points or from inability to detect the signal. In most cases this can be inferred from the time spacing of the data records themselves.

	Radial Position (units of Saturn's Radius)	Integration Time (secs) (per data point)
File 1 (13 cm)	1.2200-1.5257 1.5300-1.6400 1.9483-2.0221 2.0269-2.0340 2.0500-2.2700	2.62 10.49 2.62 10.49 2.62
File 2 (3.6 cm)	1.2200-1.5257 1.5420-1.6400 1.9446-2.0269 2.0269-2.0410 2.0410-2.0453 2.0453-2.0594 2.0594-2.2700	0.22 3.50 0.22 3.50 0.22 3.50 0.22

NB: The version of this archival data set dated 14 January 1983 was mistakenly constructed using the "standard" Saturn pole adopted by the Voyager Project (namely,  $\alpha = 38.554^{\circ}$  and  $\delta = 83.316^{\circ}$ ), despite documentation to the contrary. The present version was constructed using an improved pole, which minimizes positional discrepancies between radio and UVS (Holberg *et al.*, *Nature*, 297, 115-120, 1982) occultation profiles.

## DATA RECORDS

Numbering of words starts from 1. R indicates single precision floating point (real) word numbers (of which there are 300); D indicates double precision floating point word numbers (of which there are 150). Word numbers without prefixes are for integers (of which there are 600). MBPOWERFIT2AP is the program which generates the signal parameter estimates. RINGDATAMERGE adds geometrical factors, antenna pointing, and system temperature.

<u>Word Number</u>	<u>Mnemonic</u>	<u>Description</u>
<u>MBPOWERFIT2AP estimates:</u>		
R1	PKPWR	Peak power (negative values indicate failure to find peak)
R2	SDPWR	Standard deviation of peak power
R3	FPK	Frequency of peak
R4	SDFPK	Standard deviation of frequency of peak
R5	SIGMAX	Maximum signal
R6	PWRINT	Integrated power
R7	CORR	Correlation
R8	AVGN	Mean noise
R9	SDN	Standard deviation of noise not used
R10-R20		
<u>System temperatures:</u>		
R21	TSR	13 cm wavelength, right circular polarization
R22	TSL	left circular polarization
R23	TXR	3.5 cm wavelength, right circular polarization
R24	TXL	left circular polarization
<u>Geometry at receive time:</u>		
D13	$t_R$	Receive time, E.T. secs from 1950.0
53	DOYR	Receive time (UTC), day of year
54	HHR	hours
55	MIR	minutes
56	SSR	seconds
D15	DPDSR	fractional seconds
D16-D18	$\underline{r}_E$	Earth position
D19-D21	$\underline{v}_E$	Earth velocity
D22-D24	$\underline{r}_D$	DSS position
D25-D27	$\underline{v}_D$	DSS velocity
<u>Geometry at transmit time:</u>		
D28	$t_T$	Transmit time, E.T. secs from 1950.0
113	DOYT	Transmit time (UTC), day of year
114	HHT	hours
115	MIT	minutes
116	SST	seconds
D30	DPDST	fractional seconds
D31-D33	$\underline{r}_S$	Saturn position
D34-D36	$\underline{v}_S$	Saturn velocity
D37-D39	$\underline{r}_V$	Voyager position
D40-D42	$\underline{v}_V$	Voyager velocity
D43-D45	$\hat{\underline{u}}_E$	High gain antenna boresite unit vector

Geometry at time of ray/ring-plane intersection:

D46	$t_p$	Intersection time, E.T. secs past 1950.0
185	DOYP	Intersection time (UTC), day of year
186	HHP	hours
187	MIP	minutes
188	SSP	seconds
189	DPDSP	fractional seconds
D49-D51	$\bar{r}_p'$	Intersection point position
D52-D54	$\bar{r}_p'$	Intersection point position in Saturn-centered, Saturn equator system
D55	$ \bar{r}_p' $	Radial distance to intersection point (meters)
D56	$ \bar{r}_p' $	(km)
D57	$ \bar{r}_p' $	(Saturn radii)
D58	$\alpha_{p_1}$	Azimuthal position of intersection point, in the Saturn equator from the ascending node on the EME50 equator
D59	$\alpha_{p_2}$	Azimuthal position of intersection point, from the Saturn-earth line (see caption, Fig. 2)
D60	$\alpha_{p_3}$	Azimuthal position of intersection point, from the Saturn-sun line (see caption, Fig. 2)
D61	$\lambda$	Longitude on Saturn of sub-intersection point, using Sturms frame and Desch and Kaiser (1981) rotation
245-299		not used
300	IOUTREC	Record number (on the original tapes; these will not be sequential on the archival tape)

DATA RECORD

	1	2	3	4	5	6	7	8
0	R1 PKPWR	R2 SDFWR	R3 FPIK	R4 SDFPK				
8	R5 SIGMAX	R6 PWREINT	R7 CORR	R8 AVON				
16	R9 SDN							
24								
32								
40	R21 TGR	R22 TSL	R23 TKR	R24 TXL				
48	D13 TA		D0YR HMR	NIR SSR				
56	D15 DPDSR		D16					
64	D17		D18	E				
72	D19		D20					
80	D21	V <sub>E</sub>	D22					
88	D23		D24	F <sub>S</sub>				
96	D25		D26					
104	D27	V <sub>D</sub>	D28	t <sub>T</sub>				
112	D0YT HWT MIT SST		D30	DPDST				
120	D31		D32					
128	D33	F <sub>S</sub>	D34					
136	D35		D36	V <sub>S</sub>				
144	D37		D38					
152	D39	F <sub>V</sub>	D40	-				
160	D41		D42	V <sub>V</sub>				
168	D43		D44					
176	D45	U <sub>3</sub>	D46	t <sub>P</sub>				
184	D0YP HHP MIP SSP		D48	DPDSP				
192	D49		D50					
200	D51	F <sub>P</sub>	D52					
208	D53		D54	F <sub>P'</sub>				
216	D55 1F <sub>p1</sub> (meters)		D56 1F <sub>p1</sub> (km)					
224	D57 1F <sub>p1</sub> (Saturn radii)		D58 $\alpha_{p1}$					
232	D59 $\alpha_{p2}$		D60 $\alpha_{p2}$					
240	D61 $\lambda$							
248								
256								
264								
272								
280								
288								
296			IOUTREC					

## FIGURES

1. Solar system geometry. Velocity vectors  $\bar{v}_i$  may be associated with respective position vectors  $\bar{r}_i$ .
2. Simplified diagram of receiving/recording system at DSN station.
3. Simplified diagram of data processing system at Stanford.
4. Geometry at Saturn. The EME-1950.0 system is defined by unit vectors  $\hat{u}_{x_{50}}$ ,  $\hat{u}_{y_{50}}$ , and  $\hat{u}_{z_{50}}$ . The Saturn mean equator coordinate system is defined by the Saturn pole  $\hat{u}_{z_S}$  and by the ascending node of Saturn's equator on the earth mean equator of 1950.0  $\hat{u}_{x_S}$ . Position of the ray intercept is given by  $\bar{r}_p$  in heliocentric EME-1950.0 coordinates and by  $\bar{r}'_p$  in Saturn mean equator coordinates. In the Saturn system, the ray intercept is also given by the radius  $|\bar{r}_p|$  and azimuth  $\alpha_{p_1}$ . If unit vectors  $\hat{u}_E$  and  $\hat{u}_S$  give the directions toward earth and the sun, respectively, then alternative definitions of the azimuthal position of the ray intercept (see text) become

$$\alpha_{p_2} = \alpha_{p_1} - \arctan \{(\hat{u}_E \cdot \hat{u}_{y_S}) / (\hat{u}_E \cdot \hat{u}_{x_S})\}$$

and

$$\alpha_{p_3} = \alpha_{p_1} - \arctan \{(\hat{u}_S \cdot \hat{u}_{y_S}) / (\hat{u}_S \cdot \hat{u}_{x_S})\}$$

The arctan functions are presumed to return values over the range 0-360°.

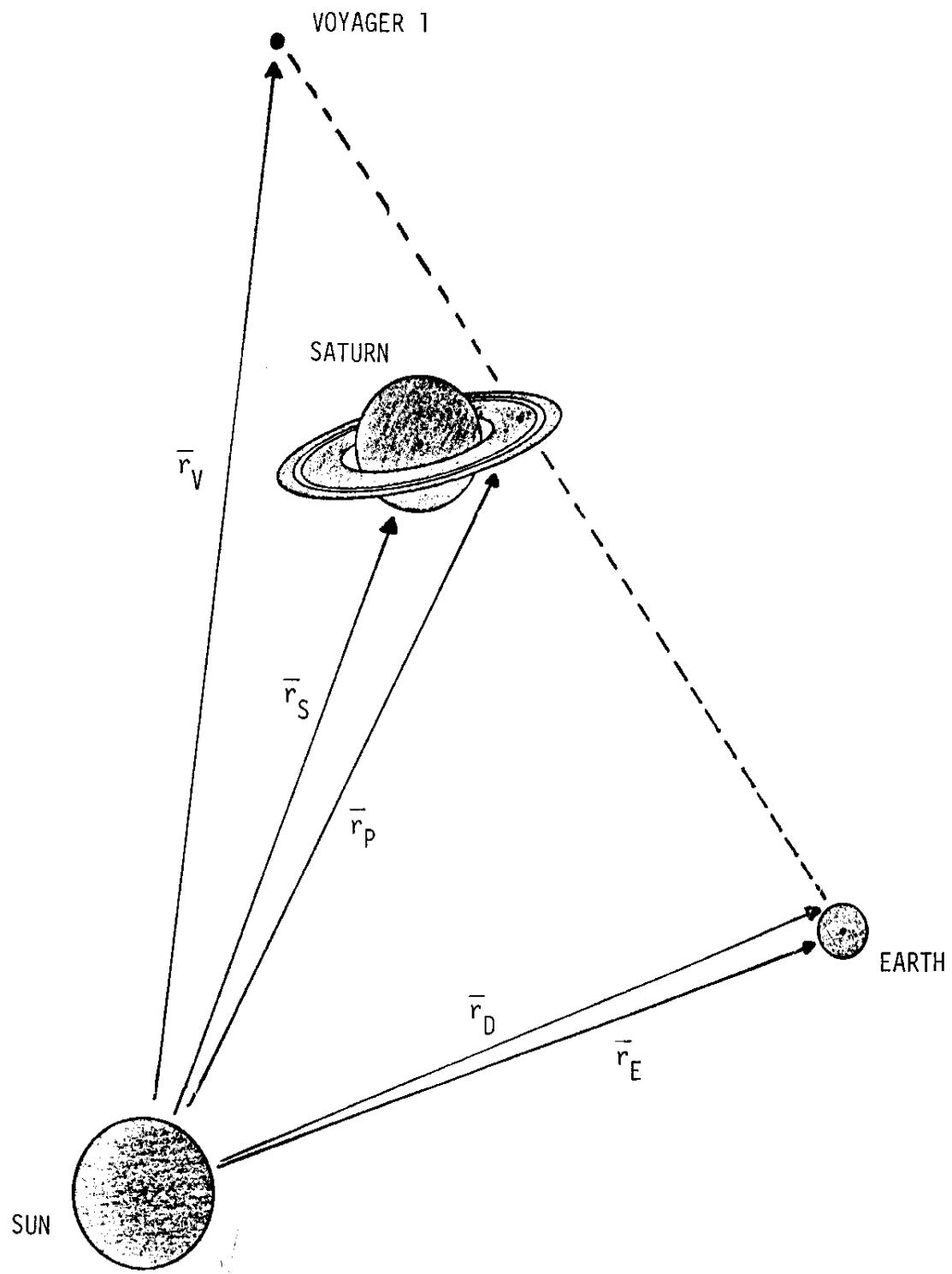


Figure 1

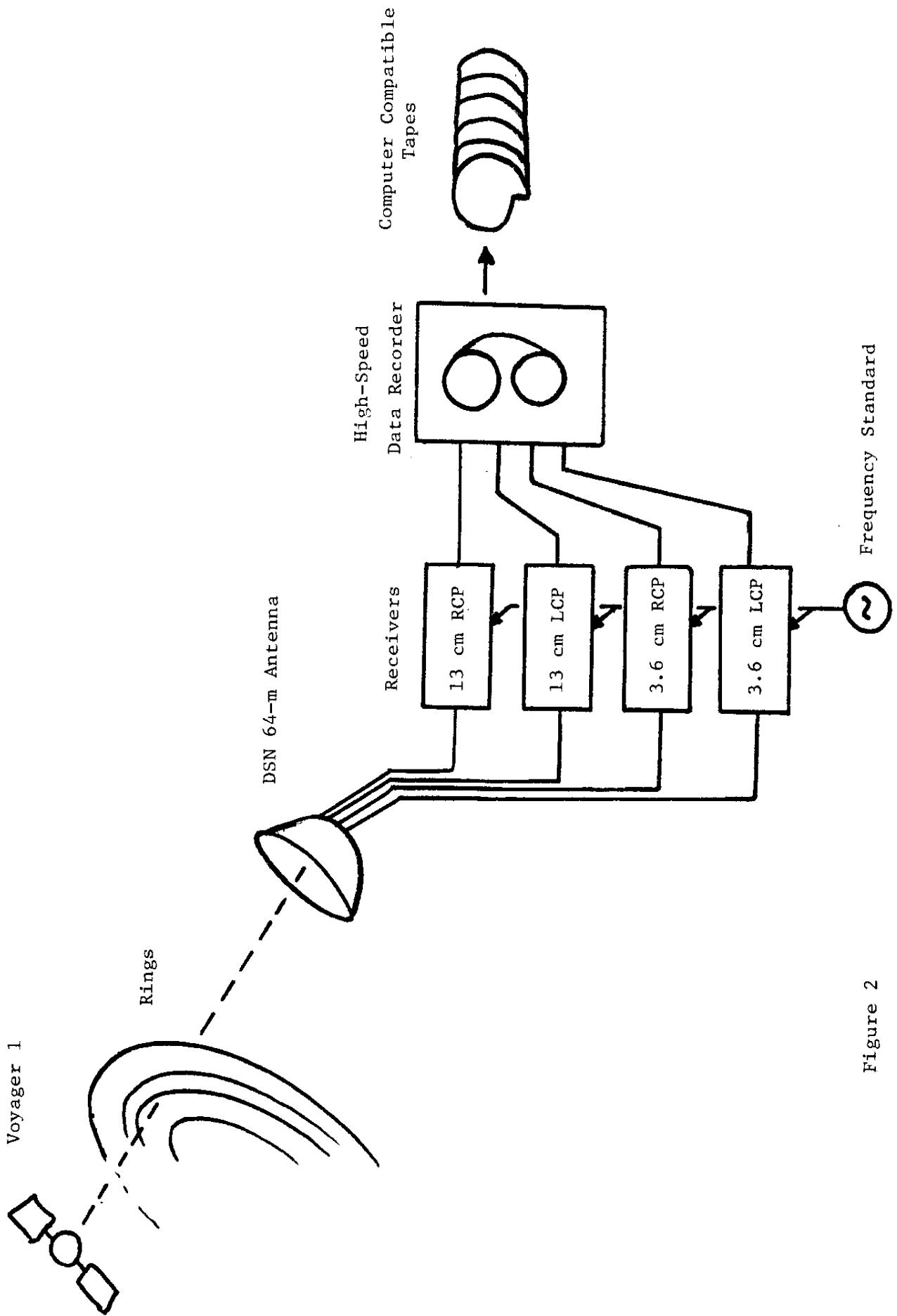


Figure 2 Frequency Standard

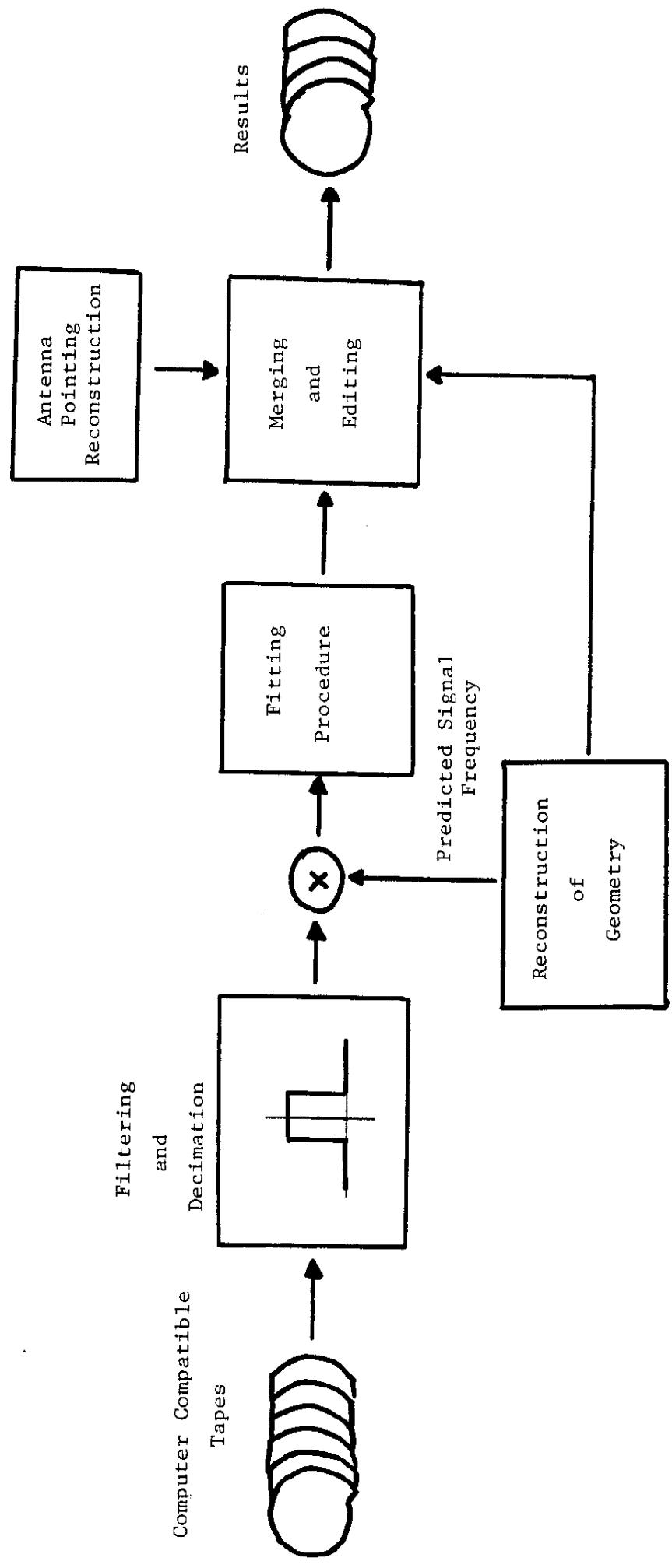


Figure 3

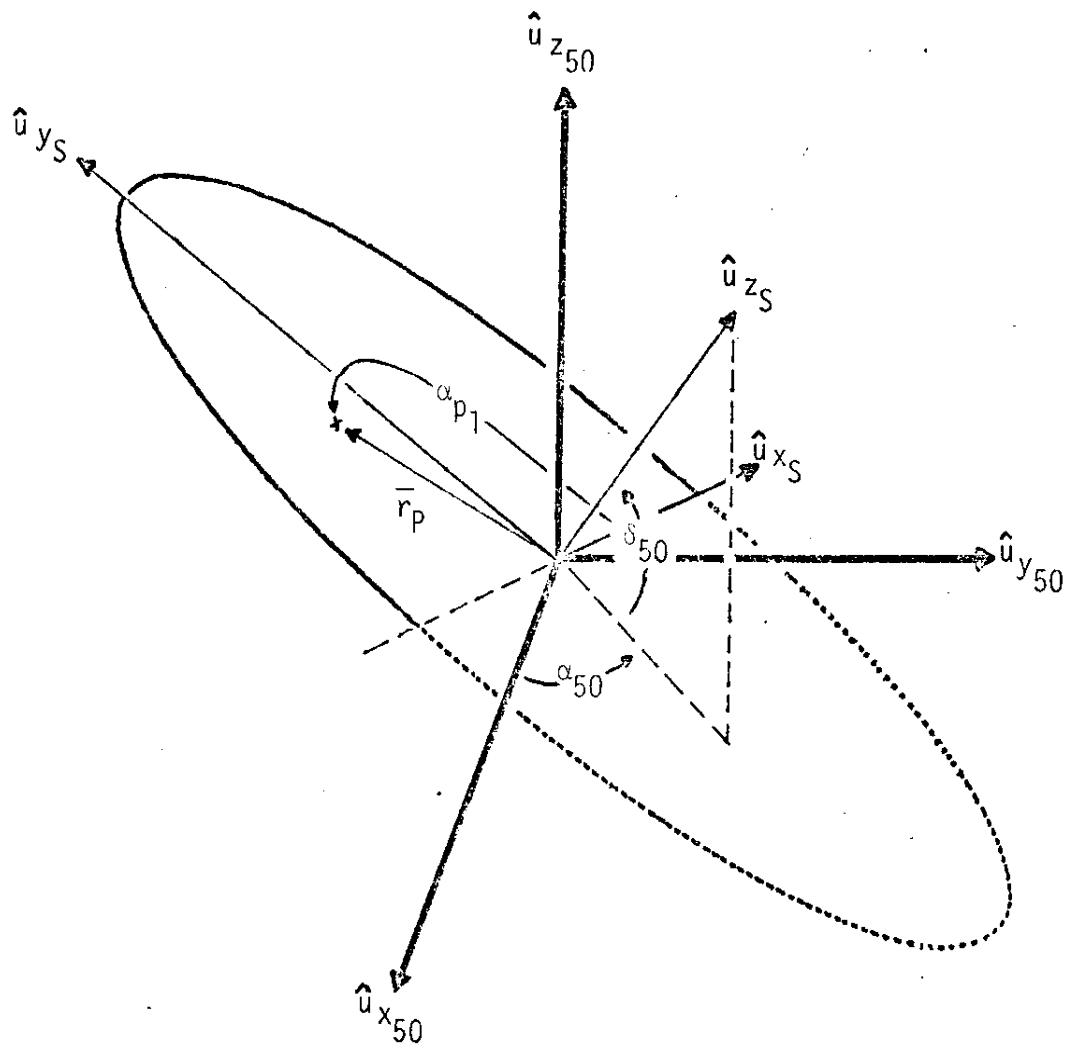
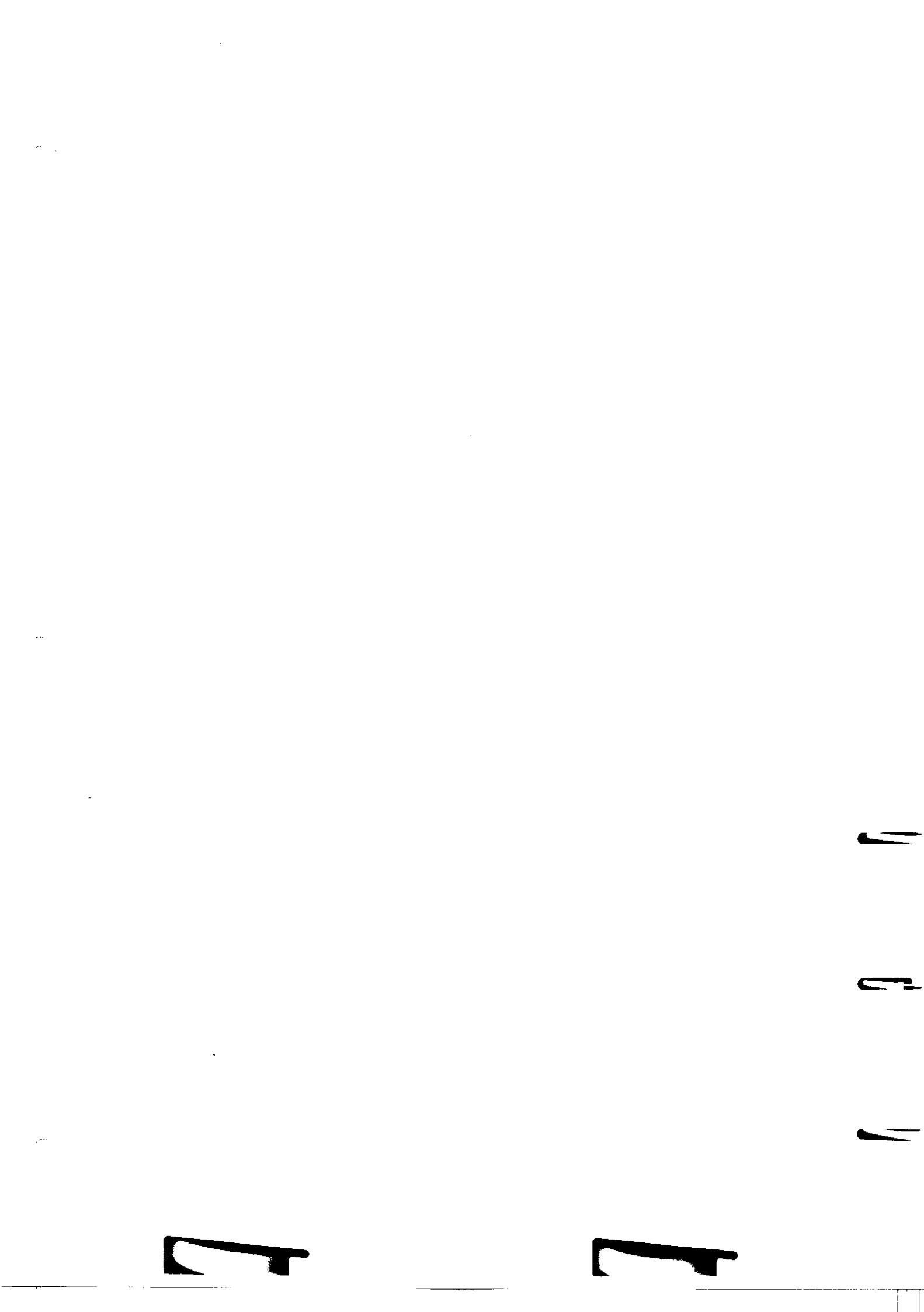


Figure 4



## NUMBER CONVENTIONS

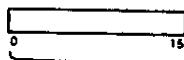
### Integer Format

We represent a signed integer by a two's-complement number in one or more 16-bit words. The sign of the number is positive if bit 0 of the first word is 0 and negative if that bit is 1.

We represent an unsigned integer by using all the bits of one or more 16-bit words to represent the magnitude.

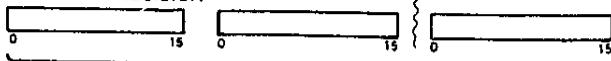
### SIGNED INTEGERS

#### SINGLE PRECISION:



#### 2's COMPLEMENT MAGNITUDE

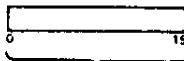
#### MULTIPLE PRECISION:



#### 2's COMPLEMENT MAGNITUDE

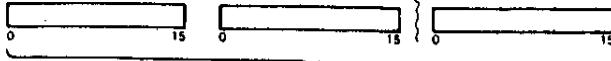
### UNSIGNED INTEGERS

#### SINGLE PRECISION:



#### UNSIGNED MAGNITUDE

#### MULTIPLE PRECISION:



#### UNSIGNED MAGNITUDE

Single precision integers are one word (16 bits) long, and multiple precision integers are two or more words long. As an example, the table below shows the possible range of single and double precision numbers represented by this format:

	Single Precision	Double Precision
Unsigned	0 to 65,535	0 to 4,294,967,295
Signed	-32,768 to +32,767	-2,147,483,648 to +2,147,483,647

In addition, there is a *Carry* bit. A change in the value of the carry bit indicates a carry out during fixed point arithmetic operations.

### Decimal Format

Unsigned decimal numbers are handled one decimal digit at a time. Each decimal digit is represented by bits 12-15 of a 16-bit word. Only the values 0-9<sub>16</sub> are used; the carry bit is used for a decimal carry or borrow.

### Logical Format

We represent logical entities as individual bits in a 16-bit word. Each bit is treated as a separate binary value. When two words are involved (logical AND or XOR, for example) only corresponding bits of each word interact. Examples of logical operations include:

- forming the logical AND of two words;
- forming the logical complement of a word;
- shifting the contents of a word left or right.

### Floating Point Format

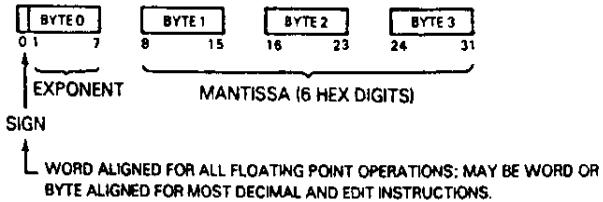
Word for word, floating point format provides a much larger range than integer format, at the expense of some precision. It also provides the ability to operate on fractions. The maximum range of floating point format is equivalent to a 16-word multiple precision integer. In addition, floating point operations are executed faster than most multiple precision integer operations.

We represent a floating point value using a 4-byte-wide (for single precision) or an 8-byte-wide (for double precision) number. The 4- or 8-byte aggregate contains 3 fields:

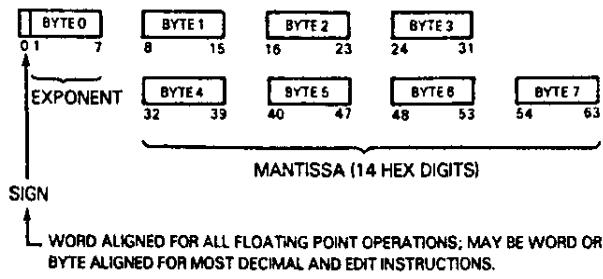
- a fractional part called the mantissa, which, at the end of all floating point mathematics operations, is always adjusted to be greater than or equal to 1/16 and less than 1 (i.e., *normalized*);
- an exponent, which is adjusted to maintain the correct value of the number;
- a sign.

Operations on numbers in memory employing the floating point arithmetic instructions require that the number be *word aligned*, that is, bit 0 of the first byte of the number is bit 0 of first word of a 2-word or 4-word area in memory. Certain operations on numbers in memory employing decimal or edit instructions allow the number to be either *word aligned* or *byte aligned*. Byte alignment means that bit 0 of the first byte of the number is either bit 0 or bit 8 of any word in memory.

#### SINGLE PRECISION (4 BYTES)



#### DOUBLE PRECISION (8 BYTES)



#### CONCEPTS AND FACILITIES

The magnitude of a floating point number is defined to be:

MANTISSA  $\times 16^{(\text{TRUE VALUE OF THE EXPONENT})}$

We represent zero in floating point by a number with all bits zero, known as *true zero*. When a calculation results in a zero mantissa, the number is automatically converted to a true zero.

#### Sign

BIT 0 of the first byte is the sign bit. If the sign bit is 0, the number is positive. If the sign bit is 1, the number is negative.

#### Exponent

The right-most 7 bits of the first byte contain the exponent. We use *excess 64* representation. For both positive and negative exponents, the value is 64 greater than the true value of the exponent. The following table illustrates this:

EXPONENT FIELD	TRUE VALUE of EXPONENT
0	-64
64	0
127	63

#### Mantissa

Bytes 1-3 (single precision) or bytes 1-7 (double precision) contain the mantissa. By definition, the binary point lies between byte 0 and byte 1 of a floating point number. In order to keep the mantissa in the range of 1/16 to 1, the results of each floating point calculation are *normalized*. A mantissa is normalized by shifting it left one hex digit (4 bits) at a time, until the high-order four bits (the left-most four bits of byte 1) represent a nonzero quantity. For every hex digit shifted, the exponent is decreased by one.

NB: Negative integers are represented in two's complement. Negative floating point numbers are given in sign-magnitude form. This should be clear from a careful reading of the above, but at least one user has been misled.

## APPENDIX

### Subroutine BEAM

FUNCTION BEAM(ANGLE,IBAND)

C  
C FUNCTION RETURNS NORMALIZED GAIN AS A FUNCTION OF ANGLE. ANGLE MEASURED  
C FROM THE VOYAGER SPACECRAFT TRANSMIT ANTENNA BORESIGHT. IF ANGLE IS  
C OUTSIDE THE MAIN LOBE, -1. IS RETURNED. ANGLE IS IN RADIANS.  
C IBAND IS 2HS FOR S-BAND AND 2HX FOR X-BAND.

C

BEAM=-1.

PI2=3.14159265/2.

IF (IBAND.EQ.2HX) THETA=102.73\*ANGLE

IF (IBAND.EQ.2HS) THETA=28.02\*ANGLE

IF (ABS(THETA).GE.PI2) GO TO 90

IF (IBAND.EQ.2HX) BEAM=COS(THETA)\*\*4.55

IF (IBAND.EQ.2HS) BEAM=COS(THETA)\*\*3.47

90 CONTINUE

RETURN

END

## HEXADECIMAL DUMP OF FILE 1 AND FIRST 3 RECORDS OF FILE 2

FILE	0	RECORD	0	1200 (0480 HEX) BYTES	ASCII INTERPRETATION
------	---	--------	---	-----------------------	----------------------

0000	564F	5441	4745	5220	5120	5241	4449	4F20	Voyager 1 RADIO.
0008	4F43	4555	4054	4154	494F	4E20	4259	2053	OCCULTATION BY S
0010	4154	5552	4E53	2052	494E	4753	0020	2020	ATURNS RINGS.
0018	2020	2020	2020	2020	2020	2020	2020	2020	

\*\*\*\*\* DUPLICATE OF ABOVE DATA \*\*\*\*\*

0026	472E	2040	454F	4E41	5244	2054	5940	4552	G. LEONARD TYLER
0030	2020	2050	5249	4E43	4950	4140	2049	4E56	- PRINCIPAL INVESTIGATOR.
0030	4553	5444	4744	544F	5200	2020	2020	2020	
0040	2020	2020	2020	2020	2020	2020	2020	2020	

\*\*\*\*\* DUPLICATE OF ABOVE DATA \*\*\*\*\*

0050	4545	4E54	4552	2046	4F52	2052	4144	4152	CENTER FOR RADAR
0058	2041	5354	524F	4E4F	4059	0020	2020	2020	ASTRONOMY.
0060	2020	2020	2020	2020	2020	2020	2020	2020	

\*\*\*\*\* DUPLICATE OF ABOVE DATA \*\*\*\*\*

0078	5554	414E	404F	5244	2045	4045	4354	524F	STANFORD ELECTRICAL
0080	4E49	4553	4046	4142	4F52	4154	4F5C	4945	LABORATORY
0086	5300	2020	2020	2020	2020	2020	2020	2020	S.
0090	2020	2020	2020	2020	2020	2020	2020	2020	

\*\*\*\*\* DUPLICATE OF ABOVE DATA \*\*\*\*\*

00A0	5354	414E	404F	5244	2055	4E49	5045	5253	STANFORD UNIVERSI
00A6	4954	5900	2020	2020	2020	2020	2020	2020	TY.
00B0	2020	2020	2020	2020	2020	2020	2020	2020	

\*\*\*\*\* DUPLICATE OF ABOVE DATA \*\*\*\*\*

00C6	5354	414E	404F	5244	2020	4541	2020	5954	STANFORD, CA - 94
00D0	5350	5500	2020	2020	2020	2020	2020	2020	305.
00D8	2020	2020	2020	2020	2020	2020	2020	2020	

\*\*\*\*\* DUPLICATE OF ABOVE DATA \*\*\*\*\*

0250	2020	2020	0053	6003	0015	0010	0020	0009	.....
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FILE	1	RECORD	0	1200 (0480 HEX) BYTES
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0000	4256	3457	4114	560F	4250	0308	5E67	0FF7	BV.WA...00..>0..
0008	4256	600F	4254	5070	0A5A	0F43	5F12	C863	BVL001PP.Z.0?..L
0010	3F15	0049	0000	0000	0000	0060	0000	0000	?..1.....
0018	0000	0000	0000	0000	0000	0000	0000	0000	.....

\*\*\*\*\* DUPLICATE OF ABOVE DATA \*\*\*\*\*

0028	421F	2500	4220	A0c1	421F	5E20	4220	0066	0.4.8 .15.1(h ..P
0030	4058	0F71	0210	A078	013F	0004	0020	0020	0.0.0.X.0.0>...+.
0036	4049	CF56	0A00	0000	4A15	E673	E457	F050	01.V....J..0..N.F
0040	4A10	0A00	7A0F	0C95	49A9	5FF5	0867	F150	J.J.Z...1.4....
0048	6456	CASF	E767	3603	4443	7303	00EA	EF59	.1.?..6<.LUS.R..Y
0050	4410	40A0	8596	9768	4A15	E650	0029	09A9	0..0....AJ..PF)..
0058	4A10	0A47	0752	6907	49A9	05E3	07E0	2A5A	J.JG.21.1.C.G.*/

0060	C450	0121	07E6	1ADA	4442	093E	54C5	70AF	.J...!....06..>1...
0060	4410	416E	C1FB	E698	483A	0F5D	03E9	90A1	U.A.....H:J....
0070	013E	0003	0012	0038	40DA	0E7F	0000	0000	>....SN.....
0078	CB14	80F4	9701	2F94	09D4	E945	D000	07CE	...../....E....
0080	4980	E9FB	53B0	0F70	C510	92BA	049B	35EE	I....L....S...
0080	C422	F9A0	2E50	5087	C3E6	A8D7	53B6	C84F	."...P1....U....
0090	C014	B214	0E74	C01F	C905	4877	F840	4E7C	....Z....NW.MLN
0098	4980	EF68	52A7	5157	C4E8	2000	207A	9916	I..H2..NW..+&Z..
00A0	C450	00F7	0F65	5380	4419	E513	9527	E330	J...E3.D....'..
00A8	40FE	93C7	0FAF	069C	401A	F029	EEBF	6C19	.......
00B0	3E0E	0C13	56D0	0879	483A	0F5D	040A	0930	>...6..TH:J....
00B8	013E	0003	0012	0039	40AB	2A0E	18A2	0000	>....9...*....
00C0	CB14	0109	9380	0H45	C905	20E0	7280	60C7	.....E..+..R...
00C8	4980	F0C0	3128	8907	C727	298F	00F5	A833	I....(....'....)
00D0	475A	410A	05AE	E0F2	E9E0	0000	0000	0000	S:A.E.....
00D8	4740	3263	84BE	039E	4514	F860	710A	016F	GF20....E..KU..!
00E0	4115	8566	5F22	A091	427B	C905	40E1	3B3A	A..F?"..D1..?..
00E8	42F6	0EFF	7590	0C06	42FA	1E45	3734	7AF3	S.N.X...0..E7..Z.
00F0	42h9	1e0E	90A0	F000	0000	0000	0000	0060	.......
00F8	0000	0000	0000	0000	0000	0000	0000	0000	.....

\*\*\*\*\* DUPLICATE OF ABOVE DATA \*\*\*\*\*

0128	0000	0000	0000	00C8	2020	2020	2020	2020	2020
0130	2020	2020	2020	2020	2020	2020	2020	2020	2020

\*\*\*\*\* DUPLICATE OF ABOVE DATA \*\*\*\*\*

0250	2020	2020	0053	0003	0015	0010	0020	0009	.S.....
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FILE - 1 - RECORD - 1 - 1e00-60460-MEX-0Y1cs

0000	4255	E78A	4115	9866	4230	0522	5260	0675	50..A..FB0..>L..
0008	4255	9621	4255	9246	5810	07A2	5F17	6F30	50..IBS..L?...?..6..
0010	3F15	8009	0000	0000	0000	0000	0000	0000	.......
0018	0000	0000	0000	0000	0000	0000	0000	0000	.....

\*\*\*\*\* DUPLICATE OF ABOVE DATA \*\*\*\*\*

0020	421F	2045	4220	A434	421F	5014	4220	6E00	0..EB..4B..N..B...
0030	463A	0F71	6517	C52A	013E	0004	0028	0020	H:..6...X..>...+..
0038	40E0	E608	6755	0000	4A15	E672	F308	AF50	....S..J..N....
0040	4A16	0A07	2AE1	F303	4949	5FF9	63A7	619E	J..J.*..CI..E....
0048	C450	CA42	7AB3	E437	4443	7300	85E2	EF78	L..S..7DCS....X
0050	4410	409F	440E	5E55	4A15	E64F	7258	80CF	0..w..U..T..J..Uk1..
0058	4A16	0A4B	3645	8F30	49A9	63E8	5206	F23A	J..JH6E..6I..C..e..
0060	C450	0118	42A2	95C5	4442	C920	5851	0017	J..S...UB..,o6..
0068	4410	4180	7A00	F000	483A	0F5D	0688	08A6	U.A.Z...H:J....
0070	013E	0003	0012	0038	4059	0904	0000	0000	>....F0Y.....
0078	CB14	00F4	9720	A1E5	C9D4	E948	6600	8546	.......
0080	4980	E9F9	2E07	1024	C510	92B9	4590	3600	I....\$....E..0..
0088	42E8	F9A0	2020	0904	03E6	AB07	6A13	9810	....(....J...)
0090	CB14	b214	9600	4F7E	C905	4887	5750	8605	....K..H..W..L..
0098	4980	EF6L	7075	4bAB	C42E	2A11	0630	5LF7	I..LPVH...*..=>..
00A0	C450	06A8	00A0	5F14	4419	C50F	2046	0000	....7..U...F..
00A8	40E0	9300	64B1	5F68	401A	F068	F46F	8F60	....7..m..N..0..0..
00B0	3F11	0F7E	5C0E	73E5	403A	0F50	0778	F752	>..T..S..H:J..X..X..
00B8	613E	0003	0015	0000	404A	1810	151E	0000	>....ad.....
00C0	CB14	0109	LB43	01E6	C905	C001	2077	7000	....C....,L..V..
00C8	4980	F0C4	7C00	7E11	C727	1142	5D72	6LF5	I...t..1...F..F..

00D0	473A	767C	412A	AES0	-B900	-0000	-0000	-0000	-0000	GXXXXX.....
00D8	4746	5c73	5202	2450	4512	00A0	9042	1595		GFRDRBSP.....
00E0	4113	0E50	09E6	88F7	4270	0002	0250	c216		A...P....BL...H"
00E8	42F6	45FC	05E1	0451	-42F9	-F541	-E906	F515		n.E....m...A....
00F0	4239	462E	02CF	4000	0000	0000	0000	0000		S.B....T.....
00F8	0000	0000	0000	0000	0000	0000	0000	0000		.....

\*\*\*\*\* DUPLICATE OF ABOVE DATA \*\*\*\*\*

0126	0000	0600	0000	-0069	2020	-2020	-2020	2020		.....
0130	2020	2020	2020	2020	2020	2020	2020	2020		.....

\*\*\*\*\* DUPLICATE OF ABOVE DATA \*\*\*\*\*

v250	2020	2020	0055	0005	9015	0010	0020	0039		.....
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FILE	1	RECORD	C	1200	10400	HEAD	DATA
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-0000	-4255	-1AE3	-4115	-7E90	-4230	-B57E	-5E00	-7F00		0000000000000000
0000	4255	2455	4252	000E	0012	7CA0	5F17	0000		0000000000000000
0010	5F15	0609	0000	0000	0000	0000	0000	0000		0000000000000000
0018	-0000	-0000	-0000	-0000	-0000	-0000	-0000	-0000		0000000000000000

\*\*\*\*\* DUPLICATE OF ABOVE DATA \*\*\*\*\*

0026	421F	1081	4220	A842	421F	54FF	4220	0050		0000000000000000
0030	485A	0F71	0706	6BDB	015E	0004	0026	0050		0000000000000000
0038	4087	-F089	-23A0	-0000	-4A15	-E672	-0319	-0000		0000000000000000
0040	4A18	0A07	00R4	59F0	49A9	5FFE	4E97	0027		0000000000000000
0040	C45E	0A45	0E00	0A0E	4443	7501	9F1A	0025		0000000000000000
0050	4410	-404E	-0E68	-6609	-4A15	-E64E	-7E0B	-9001		0000000000000000
0050	4A18	0A40	E550	E384	49A9	63EC	F1ED	0750		0000000000000000
0060	C450	0115	7090	4B43	4442	C91A	1C3E	F200		0000000000000000
-0060	4410	-4160	-5205	-6464	-4034	-0E50	-D927	-03A0		0000000000000000
0070	v13E	0005	0013	0001	40F0	F489	0000	0000		0000000000000000
0078	LB14	00F4	9750	1436	L904	E951	4500	41E3		0000000000000000
-0080	-4980	-E4F0	-0222	-5A6C	-E310	-9200	-0090	-4E04		0000000000000000
0080	C422	F4A0	2C01	5450	C5E6	A0D7	7000	6506		0000000000000000
0090	C014	0214	9B90	50E8	C905	4896	B642	6A00		0000000000000000
-0090	-4980	-EF70	-A643	-0492	-C42E	-2922	-1058	-0F84		0000000000000000
00A0	C450	0050	F1C8	A230	4419	E30A	9016	6530		0000000000000000
00A0	40FE	93E8	5478	5212	401A	F07B	F1AC	0225		0000000000000000
00B0	5CE5	-775E	-EA8C	-E509	-405A	-0F50	-0A17	-E503		0000000000000000
00B0	015E	0003	0013	0002	40C9	0611	A867	0000		0000000000000000
00C0	LB14	010A	0600	1080	C905	2C15	DE46	47F4		0000000000000000
-00C0	-4980	-F4C0	-10E5	-7910	-C726	-F464	-A04C	-A36A		0000000000000000
00D0	473A	AF1E	049C	F1FB	5A16	0000	0000	0000		0000000000000000
00D0	4746	72A6	D493	A093	4512	060E	F047	1504		0F00000000000000
-00E0	4113	-9743	-C0E0	-0E90	-4270	-9724	-e060	-537E		0000000000000000
00E8	42F6	101E	0806	70FE	42F9	C004	0500	1905		0000000000000000
00F0	4239	7558	036F	1000	0000	0000	0000	0000		00X0000000000000
00F0	0000	-6000	-0000	-0000	-0000	-0000	-0000	-0000		0000000000000000

\*\*\*\*\* DUPLICATE OF ABOVE DATA \*\*\*\*\*

0126	0000	0000	0000	000A	2020	2020	2020	2020		.....
0130	2020	2020	2020	2020	2020	2020	2020	2020		.....

\*\*\*\*\* DUPLICATE OF ABOVE DATA \*\*\*\*\*

-- PROGRAM NSSDC --

COPIES SELECTED SATURN RING OCCULTATION DATA FOR NSSDC ARCHIVE

VERSION OF 15 JAN 85 -- RAS

INPUT DATA SPECIFIED IN FILE: NSSDC.INPUTDATA  
DATA COPIED AS FOLLOWS:

OUTPUT TAPE FILE: 0

VOYAGER 1 RADIO OCCULTATION BY SATURN'S RINGS  
G. LEONARD TYLER - PRINCIPAL INVESTIGATOR  
CENTER FOR RADAR ASTRONOMY  
STANFORD ELECTRONICS LABORATORIES  
STANFORD UNIVERSITY  
STANFORD, CA 94305

TODAY IS: 85: 5:21 16:32: 4

OUTPUT TAPE FILE: 1 X-BAND

INPUT FROM: TAPE	FILE	RANGE OF SATURN RADII	LAST OUTPUT RECORD
SCRAS85	0	1.2200 - 1.3000	356
SCRAS86	1	1.2200 - 1.5257	1370
SCRAS86	3	1.5420 - 1.6400	1420
SCRAS86	1	1.9445 - 2.0000	1579
SCRAS86	2	1.9600 - 2.0269	1708
SCRAS86	3	2.0289 - 2.0410	1709
SCRAS86	2	2.0410 - 2.0453	1744
SCRAS86	3	2.0453 - 2.0594	1727
SCRAS86	4	2.0594 - 2.2700	2450

OUTPUT TAPE FILE: 2 S-BAND

INPUT FROM: TAPE	FILE	RANGE OF SATURN RADII	LAST OUTPUT RECORD
SCRAS86	5	1.2200 - 1.5257	116
SCRAS86	0	1.5300 - 1.6400	165
SCRAS86	4	1.9485 - 2.0221	168
SCRAS86	3	2.0269 - 2.0540	169
SCRAS86	5	2.0500 - 2.2100	214
SCRAS86	3	2.2180 - 2.2600	226
SCRAS86	5	2.2674 - 2.2700	227

NB: Files 1 and 2 are reversed on the archival tape so that S-Band (13 cm)  
data precede X-Band (3.6 cm).



FILE 2 RECORD 285 LENGTH 120 BYTES

( 0 )	425A6278	41194750	4230030302	3E791C33	425A6EBC	4253608C	BB2653FE	3F197EF4	3F1C4719	00C36909
( 4 )	00000000	10000000	0000000003	3000000003	0000000000	0000000000	0000000000	0000000000	0000000000	0000000000
( 8 )	421D85B2	421F65B7	421E2846	4223A4DC	483A9F75	2884A459	013E0J04	103A0810	4955C52E	72D87903
( 12 )	A415E536	2C32BBA0	4A186AAE	E93D148E	49A96648	CB63738F	C45HCDAB	4A611678	44436EEF	A2E32H57
( 16 )	441D3EF7	F78D36E8	4415E5DE	8DD5E640	4A186B2E	85D9C654	49A96A37	5CFF75E	C45CF8DE	044B1299
( 20 )	4442B1B3	115808A7	441D3ED0	3313D.FEC	423ACF61	42B67EA	113E0J03	4021L02A	44CC2788	00000001
( 24 )	CB14B0F4	D05C7143	C9D4F006	B5BE1376	498CE6DD	24BA8529	C31091BD	DE1516B8	A7FB6AE	00000000
( 28 )	C3E6ABDF	F3C1D10Z	CB14B21E	6A2DBB28	C9D55CB8	2D1AD92D	498CE500	DECE6B2B	C42CFE54	58AB3CB5
( 32 )	C45D68CE	F432D668	4419D92B	24A886C4	43F8E82F	51ABCD49	41B23AC	39F02N5	3EFBF83	5FD82812
( 36 )	483A9F61	A4B04B65	013E0E003	0U21492B	40816C93	5C54A000	CB14B155	69E41ECD	C9D5473C	844C7CBD
( 40 )	498CE603	F478E05	7683E2B1	478E3F35	5F3C2DAAD	BA1E0009	00000006	47829253	CA5D24E1	00000000
( 44 )	45216D3	04B37E2C	41244F82C	BCE95EF2	425D51A7	DC13EB92	42D7D765	227D0692	42DB6E63	8ADFA0B
( 48 )	42DFFECB	E1785009	400000009	CC6100000	00000000	00000000	00000000	20000000	00000000	00000000
( 52 )	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
( 56 )	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
( 60 )	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
( 64 )	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
( 68 )	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
( 72 )	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
( 76 )	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
( 80 )	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
( 84 )	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
( 88 )	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
( 92 )	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
( 96 )	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
( 100 )	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
( 104 )	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
( 108 )	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
( 112 )	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
( 116 )	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000

FILE INPUT DATA RECORDS - MAX RECS: INPUT SIZE PERM ZERO H SHRT UNDEF. INPUT RETRIES #RECS. TOTAL # R.

2	228	229	1200	0	0	0	0	0	0	0
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FILE 3 RECORD 1 LENGTH 120 BYTES

( 0 )	43199808	41591084	4292851F	3F46A38A	4319976F	43172AA1	3C3CDFE6	3F4D41A0	3F4D7809	70000000
( 4 )	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
( 8 )	421F24CE	4220AC0F	421F5E0E	4220D055	483A0F71	6298933E	013E0004	002B002B	4369B41C	3FF40000
( 12 )	A415E673	D8E86B70	4A186A46	8276D73	49A95EE5	43176AE	C45BCA4A	468C93D6	44373C3	42A7BASE
( 16 )	441D40AC	764EAFOE	4A15E650	5A9399F1	4A166A47	8F847749	49A963E3	A2117EB3	C45D012R	C15B846E
( 20 )	4442C93D	786ADBDZ	441D418E	B2655E33	D4092829C	013E0003	012A0038	48DAA37A	50C0L0G1	00000000
( 24 )	CB14B0F4	97034762	C9B3F7E	498CEB2E	C31J9	FE877673	00000000	00000000	00000000	00000000
( 28 )	C3E6ABD7	63D5B68C	CB14B21E	8ED623B	C9D54878	63517BAA	498CE6E6	6641C61B	422E2A4E	686LDD3
( 32 )	C45DD0F3	4D5151863	4419E313	5F1F13F9	40FE93C7	15817346	401AF02D	1249D16F	3EDE37A7	4F801AED
( 36 )	483A0F5D	D4E9EFC07	013E0003	0012A039	40CE1ACES	7A600000	CB14B102	9673095E	C9D52BED	6E8769B2
( 40 )	498CFCC9	B1B34445	C727266C	A773D1B6	473A4473	1462C661	BA240010	63005400	474633E8	F6BF232H
( 44 )	4511F8CE	1845150AE	411385D2	7EE15FAE	427LE711	6D4C835	A2D5BAA2	42E1AC51	6365193C	00000000
( 48 )	42B9191F	OD2E6000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
( 52 )	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
( 56 )	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
( 60 )	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
( 64 )	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
( 68 )	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
( 72 )	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
( 76 )	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000

FILE INPUT DATA RECORDS - MAX RECS: INPUT SIZE PERM ZERO H SHRT UNDEF. INPUT RETRIES #RECS. TOTAL # R.

2	228	229	1200	0	0	0	0	0	0	0
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FILE	3 RECORD	LENGTH	432	1200 BYTES
( 80)	20202020 20202020 20202020	1	20202020	20202020 20202020 20202020
( 84-0)	20202020 20202020 20202020	1	20202020	20202020 20202020 20202020
( 88-0)	20202020 20202020 20202020	1	20202020	20202020 20202020 20202020
( 92-0)	20202020 20202020 20202020	1	20202020	20202020 20202020 20202020
( 96-0)	20202020 20202020 20202020	1	20202020	20202020 20202020 20202020
( 100-0)	20202020 20202020 20202020	1	20202020	20202020 20202020 20202020
( 104-0)	20202020 20202020 20202020	1	20202020	20202020 20202020 20202020
( 108-0)	20202020 20202020 20202020	1	20202020	20202020 20202020 20202020
( 112-0)	20202020 20202020 20202020	1	20202020	20202020 20202020 20202020
( 116-0)	20202020 20202020 20202020	1	20202020	20202020 20202020 20202020
( 0)	431050F3 416220E3 4292873F	1	3F43E499	431A7DC6 3C43FC6D
( 4-0)	40000000 00000000 00000000	1	30013003	00000000 00000000
( 8-0)	421D8587 421D8587 421D8587	1	40040000	40040000 40040000
( 12-0)	4A15E536 4CB4BEBD 4A196AE0	1	20202020	20202020 20202020
( 16-0)	44103EF7 CD784922 4A15E5F6	1	20202020	20202020 20202020
( 20-0)	44442B1C C5AEE91 4A1D3EDD	1	20202020	20202020 20202020
( 24-0)	CB1480F4 D9622063 9D4FGD7	1	20202020	20202020 20202020
( 28-0)	C3E6ABDE E42BA978 6B24AEAD	1	20202020	20202020 20202020
( 32-0)	C45D68C4 AC01B899 44190929	1	20202020	20202020 20202020
( 36-0)	4834D0E51 4B0817CC 413E0DD03	1	20202020	20202020 20202020
( 40-0)	498CF604 7A01FCC4 C678C115	1	20202020	20202020 20202020
( 44-0)	45216EEA 6A11E7C A12A517B	1	20202020	20202020 20202020
( 48-0)	42E0012C 8BBEFE009 00000000	1	20202020	20202020 20202020
( 52-0)	00000000 00000000 00000000	1	20202020	20202020 20202020
( 56-0)	90000000 10000000 00000000	1	20202020	20202020 20202020
( 60-0)	20202020 20202020 20202020	1	20202020	20202020 20202020
( 64-0)	20202020 20202020 20202020	1	20202020	20202020 20202020
( 68-0)	20202020 20202020 20202020	1	20202020	20202020 20202020
( 72-0)	20202020 20202020 20202020	1	20202020	20202020 20202020
( 76-0)	20202020 20202020 20202020	1	20202020	20202020 20202020
( 80-0)	20202020 20202020 20202020	1	20202020	20202020 20202020
( 84-0)	20202020 20202020 20202020	1	20202020	20202020 20202020
( 88-0)	20202020 20202020 20202020	1	20202020	20202020 20202020
( 92-0)	20202020 20202020 20202020	1	20202020	20202020 20202020
( 96-0)	20202020 20202020 20202020	1	20202020	20202020 20202020
( 100-0)	20202020 20202020 20202020	1	20202020	20202020 20202020
( 104-0)	20202020 20202020 20202020	1	20202020	20202020 20202020
( 108-0)	20202020 20202020 20202020	1	20202020	20202020 20202020
( 112-0)	20202020 20202020 20202020	1	20202020	20202020 20202020
( 116-0)	20202020 20202020 20202020	1	20202020	20202020 20202020

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